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MASTER OF MILITARY STUDIES

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**Effective or Efficient: The Conundrum of the Armed Reconnaissance Squadron**

SUBMITTED IN PARTIAL FULFILLMENT
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## *Executive Summary*

**Title: Effective or Efficient: The Conundrum of the Armed Reconnaissance Squadron**

**Author:** Major Daniel K. Mark, United States Army

**Thesis:** The ARS requires a fundamental redesign because it does not provide a substantial or unique capability to the HBCT commander.

**Discussion:** The focus of this study is the Heavy Brigade Combat Team's (HBCT) Armed Reconnaissance Squadron (ARS) and its role in providing relevant information to the Brigade Commander to achieve decision superiority. Cavalry organizations exist to provide the commander with three capabilities- reconnaissance, security, and economy of force operations. However, Reconnaissance Squadrons in every type of BCT are only capable of performing one of the three core missions- reconnaissance. Given the current operational situation in Iraq and Afghanistan, this limited design is not acceptable.

**Conclusion:** With the current ARS design, the US Army traded efficiency for effectiveness. However, with a few adjustments, the ARS could perform as designed- a squadron able to execute reconnaissance, security, and enabling missions. The addition of one tank platoon per cavalry troop (for a total of three additional tank platoons) in the brigade can provide significant benefits. Likewise, the addition of six scouts to each scout platoon (for a total of 36 troopers per brigade) exponentially increases the capability of the ARS. Now is the time to make modifications to the ARS to provide unique and beneficial capabilities to the Brigade Commander across the full-spectrum of conflict.

## *DISCLAIMER*

THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

## *List of Figures*

## *Table of Contents*

## *Preface*

I first became involved with the Armed Reconnaissance Squadron during the spring and summer of 2005 where I was involved in "resetting" 1-7CAV, 1st Cavalry Division from a Divisional Cavalry Squadron to 6-9 CAV, an Armed Reconnaissance Squadron. I served as a Ground Troop Commander in the Divisional Cavalry Squadron during Operation Iraqi Freedom II and commanded Headquarters and Headquarters Troop, 1-7CAV when it transformed into 6-9CAV.

While most of the officers and senior non-commissioned officers understood the requirement to enlarge the brigade-level cavalry unit, we didn't fully understand the decision to make the ground combat troops within the Armed Reconnaissance Squadron so weak. Our first field exercise confirmed our suspicions-- we were too strong to serve solely as a reconnaissance asset, but not strong enough to complete the full range of cavalry missions. Until now, I never really had the time or energy to research the decision further.

I would like to thank Dr. Charles "Doug" McKenna for his patience and guidance throughout the MMS process. I appreciate the personal time dedicated to ensure my success. Finally, I would like to thank my wife Dina and my family for their support. Thank you giving me the time to complete this paper and reviewing my work and giving honest feedback.

## *Introduction*

In the last eight years, the US Army has undergone a significant transformation of organization, personnel, and equipment. A chief component of this endeavor was an attempt to efficiently employ all available forces in order to lower the "cost of business." However, there is always assumed risk in any transformative effort. As a British historian noted "In structuring and preparing an army for war, you can be clear that you will not get it precisely right, but the important thing is not to be too far wrong, so that you can put it right quickly."[1] To prove these new concepts were more right than wrong, Joint Forces Command conducted the largest US military exercise ever- Millennium Challenge 2002.

The Joint Service proof of concept exercise, Millennium Challenge 2002, tested the emerging doctrine of Network-Centric Warfare, especially the concept of Rapid Decisive Operations (RDO). Due to the success of the experiment, RDO quickly became the operating principle of the United States Army. However, RDO requires an ability to gain information superiority over the enemy in order to sense, decide, and act first in order to apply precise combat power to achieve strategic results. Army Field Manual FM1, *The Army*, reflects the importance of RDO to achieve victory.

> The Army must gain information superiority. This means the operational advantage derived from the ability to collect, process, and disseminate an uninterrupted flow of information... The cumulative effect of simultaneous shaping operations and nearly simultaneous decisive operations will be to reduce an adversary's ability to synchronize his effort and will establish the military conditions for friendly victory- decisive victory[2]

In other words, RDO demands decision superiority. To prove decisive across the full spectrum of conflict, RDO needs a highly trained, capability tailored, and strategically mobile force fueled by information. Since the US Army did not contain this capability, it had to create one.

The modular force bridges the gap between the legacy Limited Conversion Division XXI (LCD XXI) structure, and the desired future capability, the Objective Force. That bridging organization is the modular force. In the modular force, the US Army identified the Brigade Combat Team (BCT) as the principal fighting organization. Pointing to the success of the Interim Brigade (I-BCT) during Millennium Challenge 02 (MC 02), the I-BCT became the inspiration of the modular brigade. The I-BCT proved the ability to precisely meter the application of force supported by information superiority. A critical component of the I-BCT's information superiority was the Brigade Commander's dedicated Reconnaissance, Surveillance, and Target Acquisition (RSTA) Squadron. Dedicated reconnaissance assets at the brigade level proved to be a decisive element of information dominance and prompted a systemic change to the structure of all US Army Brigade Combat Teams (BCT).

The focus of this study is the Heavy Brigade Combat Team's (HBCT) Armed Reconnaissance Squadron (ARS) and its role in providing relevant information to the Brigade Commander to achieve decision superiority. This paper will demonstrate that the ARS requires a fundamental redesign because it does not provide a substantial or unique capability to the HBCT commander. In other words, the US Army achieved efficiency at the expense of effectiveness.

To demonstrate that the ARS is not an effective enabler to the HBCT's mission accomplishment, this study will explore the role of cavalry, explain the concept of Rapid Decisive Operations and the subsequent rise of the modular force, describe the organization of the Armed Reconnaissance Squadron, examine the evolution of the capability of brigade cavalry,

and evaluate the performance of the ARS in Operation Iraqi Freedom. These elements will assist in determining if the Armed Reconnaissance Squadron provides the Brigade Commander the capabilities required for decision superiority across the full spectrum of conflict. Additionally, this paper will explore a change to the Armed Recon Troop to include one tank platoon and six additional scouts per scout platoon to enable the Brigade Commander to operate effectively across the full-spectrum of conflict.

## *What is Cavalry?*

The concept of cavalry evokes many perceptions. Some may recall "cavalry" as a horse-mounted cavalry charge, while others consider "cavalry" as helicopter-based Air Mobile units like those used in the Vietnam War. While historically correct, this paper will use the US Army's current description of cavalry as a unit "to perform reconnaissance and to provide security in close operations. *Cavalry clarifies, in part, the fog of battle.* Cavalry is, by its role, an economy of force. The flexible capabilities of cavalry allow the commander to conserve the combat power of divisions or brigades for engagement where he desires."[3] This definition contains three critical concepts that shape the core capabilities of cavalry and demand further exploration- reconnaissance, security, and economy of force.

The Army Field Manual on tactics defines reconnaissance as "those operations undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographical, or geographical characteristics and the indigenous population of a particular area."[4] Cavalry units perform reconnaissance to provide fresh information about the enemy and terrain to the commander. In other words, reconnaissance assists the commander in

finding opportunity in the chaos."[5] There are four reconnaissance operations that cavalry units typically perform: reconnaissance in force and zone, area, and route reconnaissance.

Additionally, there are two methods to perform reconnaissance operations- stealthy and aggressive reconnaissance. Stealthy reconnaissance involves gathering information on the terrain or enemy without detection using passive means-in other words surveillance. Stealthy reconnaissance includes observation or the use of sensors. Gathering information about terrain or against a threat with poor operational security is the best employment of stealthy reconnaissance. By design, the Armed Reconnaissance Squadron can only perform stealthy reconnaissance.

On the other hand, aggressive reconnaissance involves combat operations to wrest information from the enemy. Since the enemy historically attempts to hide their capabilities and intents, often the best method to obtain information is aggressive reconnaissance. Cavalry units must be able to "fight for information" as required. Army doctrine notes that the all brigade reconnaissance squadrons "require vehicles and aircraft that allow reconnaissance by stealth and the ability to fight when necessary... [they require] tanks or other heavier vehicles, attack helicopters, and fire support, which provide the primary fighting capability [when performing aggressive reconnaissance]."[6] Cavalry needs the ability to function at both extremes of the reconnaissance spectrum in order to provide relevant information to the commander so that they may quickly and effectively accomplish the mission.

Now is an appropriate opportunity to address a common misperception regarding reconnaissance and surveillance. Although reconnaissance and surveillance both involve the collection of information, the methods employed are vastly different. Army doctrine clears the confusion by stating:

> Surveillance is distinct from reconnaissance. Often surveillance is passive and may be continuous; reconnaissance missions are typically shorter and use active means (such as maneuver). Additionally, reconnaissance may involve fighting for information... Reconnaissance involves many tactics, techniques, and procedures throughout the course of a mission. An extended period of surveillance may be one of these.[7]

While cavalry performs surveillance as part of operations, surveillance is not the same as reconnaissance. A completely different type of organization accomplishes surveillance missions. Surveillance units, like the Battlefield Surveillance Brigade, are structured differently than reconnaissance organizations because active, conventional ground combat is not expected or required. Some examples of surveillance capabilities are: aerial platforms (U2, Global Hawk, etc), satellites, signals intelligence, or Special Forces. These operations are distinct from reconnaissance and are not the subject of this study.

Army doctrine details the purpose of security missions as "operations undertaken by a commander to provide early and accurate warning of enemy operations, to provide the force being protected with time and maneuver space within which to react to the threat, and to develop the situation to allow the commander to effectively use the protected force."[8] Typical security missions include: screen, guard, cover, and area security operations. The commander relies on cavalry to "protect and preserve combat power... [and] to protect itself from surprise, interference, sabotage, annoyance, and threat surveillance and reconnaissance."[9] In essence, the commander expects the cavalry to provide protection and freedom of maneuver. Interestingly, Army doctrine recognizes that the "modular Brigade Combat Team reconnaissance squadrons are not organized, manned, or equipped to execute the full spectrum of security missions...[they] must focus their efforts and mission sets on reconnaissance."[10] However, Reconnaissance Squadron notes 'information dominance, when achieved, is security."[11]

Finally, cavalry units provide a flexible force to the commander able to conduct a variety of missions to preserve combat power. Cavalry units may perform economy of force missions or enabling operations across the full-spectrum of conflict. Cavalry units may perform hasty or deliberate attacks, a movement to contact, or they may defend a battle position, defend in sector, or conduct retrograde operations in support of the commander's intent. Enabling operations include: infiltrations; passage of lines; relief operations; Chemical, Biological, Radiological, and Nuclear Defense (CBRN) Defense; and obstacle breaching operations. As with the previous types of cavalry missions, the Armed Reconnaissance Squadron requires significant reinforcement to conduct many of these missions.

## *A New Way to Fight*

To appreciate the decisions made to create the modular force and the ARS, it is imperative that one understands the Army's change in doctrine towards a more nimble, lighter force and away from large mechanized formations. This section will briefly describe network-centric operations and the two practical applications of this theory: Effects Based Operations (EBO) and Rapid Decisive Operations (RDO).

Although there are many theories of warfare, right now none have the traction of Network Centric Warfare within the United States Department of Defense. In fact, a report for the United States Congress published in June 2004 indicates "the network centric approach to warfare is the military embodiment of information age concepts."[12] Network-centric operations espouse information dominance as a central precept. This theory describes "a network of nodes and links where information is the key currency of exchange."[13] The key to winning war in the information age is to dominate critical segments of the information sphere.

Although Effects Based Operations and Rapid Decisive Operations may appear similar, they are quite different and it is important to observe the distinction in order to understand why the Army chose RDO over EBO. The US Joint Warfighting Center defines EBO as "operations that are planned, executed, assessed, and adapted based on a holistic understanding of the operational environment in order to influence or change system behavior or capabilities using the integrated application of selected instruments of power to achieve directed policy aims."[14] Effects Based Operations focus on the desired end state, not the tasks. For example, a commander may want to erode an enemy's will to fight. To accomplish this task, there are many different methods. One method may be to direct a ground combat unit to physically destroy the enemy. Another may be to apply operational fires from strategic bombers. Still another could be to apply psychological operations to erode the enemy's psychological capital. Regardless of the method, the realization of the end state is essential and this is the fundamental premise of Effects Based Operations.

Conversely, Rapid Decisive Operations envision "full spectrum dominance...to defeat any adversary or control any situation across the full range of military operations based on the capability to sense, understand, and act faster than any adversary in any situation."[15] This concept stipulates that ***commanders must achieve information dominance in order to out-pace and out-think the enemy without the application of significant combat forces.*** The Millennium Challenge 02 (MC 02) exercise validated RDO for the Army and it quickly became the basis of doctrine.[16]

Operation Enduring Freedom (OEF) expedited the transformation of the Army. Mechanized forces proved cumbersome and ill-suited for deployment to and operations within Afghanistan and the light infantry force within the Army lacked the tactical mobility required to

secure the entire country. However, a small group of highly mobile and extraordinarily trained Special Forces soldiers on horseback defeated the Taliban.[17] These soldiers mastered the ability to mass effects by leveraging information technologies to apply pressure through the use of precision fires. For the second straight conflict, the mechanized Army watched from the sidelines.

However, the Department of Defense made the decision for change well before the start of OEF. In fact, with the success of the I-BCT during Millennium Challenge 02, the Army had already decided that modular brigades were the future. The Chief of Staff of the Army, General Eric Shinseki, would take the lessons of Bosnia and couple them with Network-Centric Warfare theory to champion a new organization- the Modular Force.

## *The Modular Brigade*

The transformation of the Army into modular brigades occurred while executing combat operations in Iraq and Afghanistan. In fact, the first two rotations of forces to Iraq operated under the legacy Limited Conversion Design (LCD) XXI force structure. Heavy Division transformation did not begin in earnest until the 3rd Infantry Division returned from its deployment to OIF I and "reset" into the new modular formations. Around March 2005, brigades within the 3rd Infantry Division began their second deployment to Iraq as the first modular formations.

In the current modular design, BCTs have three different compositions. First is the Infantry Brigade Combat Team (IBCT). The IBCT replaced all of the specialized light infantry brigades with a single, uniform design capable of great strategic, but limited tactical mobility. Next is the Stryker Brigade Combat Team (SBCT), formerly known as the Interim Brigade

Combat Team (I-BCT). It provides the US Army a medium weight, lightly armored, motorized Infantry Brigade tailored to meet the demands of most combat operations but at the expense of limited survivability. The modular brigade followed the Stryker brigade template. Finally, the Heavy Brigade Combat Team (HBCT) is the mechanized force that replaced the mechanized infantry and armored brigades (Figure 1). The HBCT is tactically mobile and capable of long-duration tactical operations, but has limited strategic mobility. It also requires the greatest logistical support of all the BCTs.

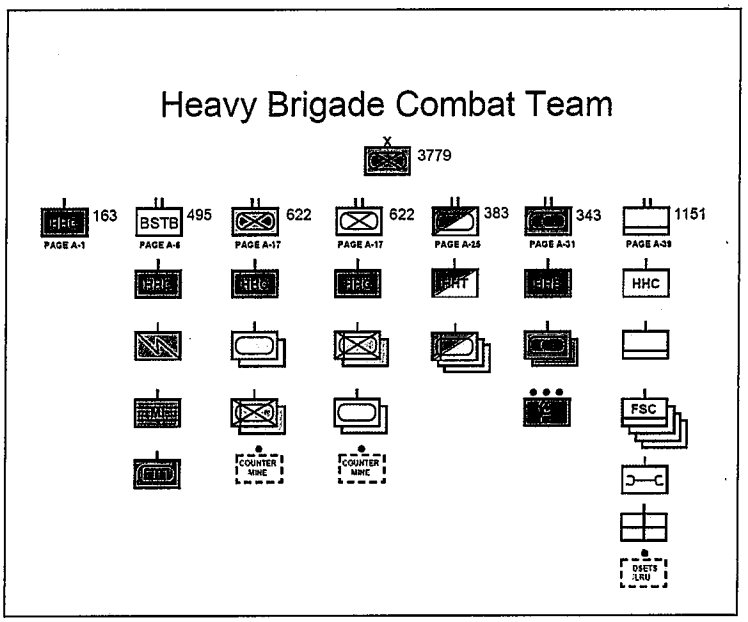


**Figure 1:** Heavy Brigade Combat Team[18]

The modular force is a compromise of current capabilities to achieve RDO. The Armed Reconnaissance Squadron (ARS) exists because the I-BCT proved the necessity of a dedicated and robust reconnaissance capability at the brigade level. However, when the US Army adapted the I-BCT concept, it did not keep the I-BCT's three maneuver battalions. Due to equipment and personnel limitations, the Army decreased the number of maneuver battalions in each brigade from three to two. The Army chose this path to increase the number BCTs without significantly

increasing the number of maneuver battalions. The result is that the ARS often performs missions as a third maneuver element for the brigade- missions for which it was not designed.

In contrast to the ARS, the Combined Arms Battalion (CAB) is the primary fighting organization of the HBCT (Figure 2). The CAB consists of approximately 750 soldiers organized into two mechanized infantry, two armor, and one headquarters and headquarters companies. Within the headquarters company, there is one motorized scout platoon and one 120mm self propelled mortar platoon. The CAB is a very capable, self-contained fighting organization.

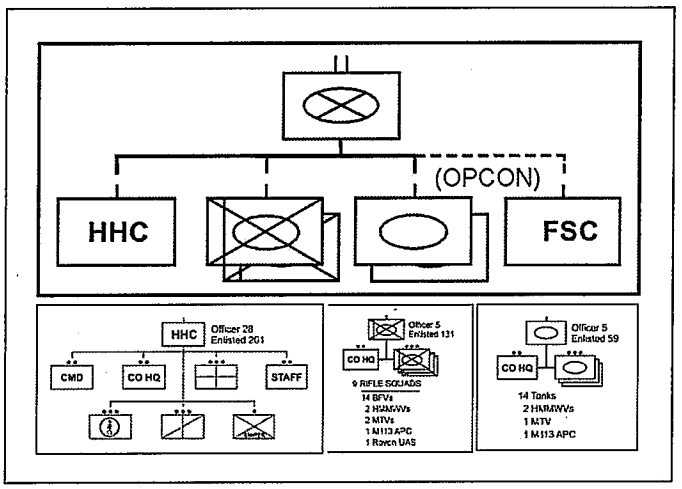


**Figure 2:** The Combined Arms Battalion[19]

## *The Armed Reconnaissance Squadron*

The Armed Reconnaissance Squadron consists of approximately 379 soldiers divided into four troops: three Ground Combat Troops (GCT) and one Headquarters and Headquarters Troop (HHT) (Figure 3).

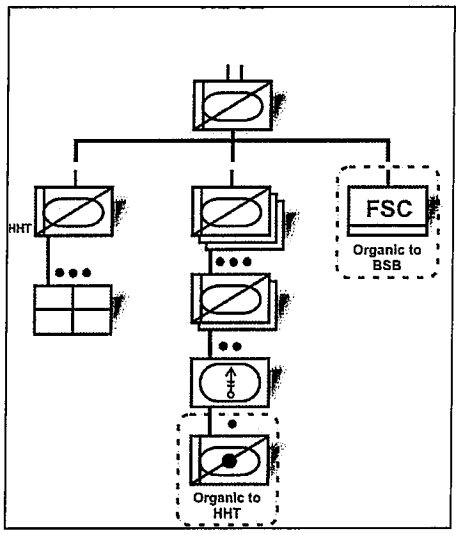


**Figure 3:** Armed Reconnaissance Squadron[20]

Each GCT has 81 soldiers organized into two scout and one headquarters platoon and one mortar section. Each scout platoon has 30 soldiers and consists of three M3 Cavalry Fighting Vehicles and five M1114 Up-Armored HMMWVs. The HHT consists of the Squadron staff and the fire support, communication, and medical platoons. Often, the support battalion attaches the Forward Support Troop to the squadron forming D Troop (Support). An ARS includes these major combat systems (Figure 4).*

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* Please see Appendix A for the full Table of Organization and Equipment (TOE) and Appendix B for detail on each combat system.

| | Squadron | Troop | Platoon |
|---|---|---|---|
| **Soldiers** | **379** | **81** | **30** |
| **M3 (CFV)** | **23** | **7** | **3** |
| **M1114** | **30** | **10** | **5** |
| **120mm Mortars** | **6** | **2** | **0** |
| **Javelin** | **12** | **4** | **2** |
| **LRAS3** | **12** | **4** | **2** |

**Figure 4:** Table of Organization and Equipment (ARS)[21]

The purpose of the ARS is to conduct ISR (Intelligence, Surveillance, and Reconnaissance) on multidimensional and asymmetrical threats operating in complex and/or urban terrain within the BCT Area of Operations.[22] The ARS leverages information technology, air and ground assets in order to maintain mobility and agility for the BCT commander. This allows the BCT commander to choose the circumstances to engage the threat.[23] In order to accomplish its mission, the ARS provides five critical capabilities to the BCT commander:

1. Provide all-weather, continuous, accurate, and timely Intelligence, Surveillance, and Reconnaissance (ISR) in complex, close, and urban terrain.

2. Conduct close reconnaissance of threat forces; Unmanned Aerial Surveillance, Chemical, Biological, Radiation, Nuclear (CBRN) reconnaissance, ground-based sensors and PROPHET assets; and aerial scouts.

3. Gather information about multidimensional threats, both conventional and unconventional.

4. Reduce risk and enhancing survivability by providing information that allows the BCT to avoid contact or to achieve overwhelming combat power if contact is necessary.

5. Fight for information against light/motorized forces or heavier threats when augmented.[24]

However, Army doctrine also recognizes that there are significant limitations with the ARS. First, the ARS lacks lethality and survivability against armored threats. Second, it requires significant augmentation to perform economy of force missions. Finally, the ARS cannot operate over extended distances due to sustainment constraints.[25] Army doctrine states that cavalry organizations must be able to perform reconnaissance, security, and economy of force missions.

## *The Evolution of Brigade Cavalry*

A popular misconception is that the Armed Reconnaissance Squadron represents a degradation of cavalry capability. This is not true. The comparison is in reference to the division cavalry squadron. These squadrons possessed significant combat power and consisted of 41 M3 Cavalry Fighting Vehicles, 27 M1 tanks, 16 OH-58D Kiowa Warriors aero-scouts, and six M1064 120mm self-propelled mortars. Although these formations could be attached to the brigade, in reality, they were a division asset and acted as the "eyes and ears" of the Division Commander.

Under the modular redesign the amount of cavalry available to the brigade actually increased from five light scout platoons to six heavy platoons within the ARS and two light scout platoons within the CABs. To fully understand why the Army chose the ARS organization, one must have an understanding of the evolution of brigade level cavalry organizations from Desert Storm to present.

During Desert Storm the heavy Brigade Commander did not possess any organic cavalry formations. In order for the brigade to gain intelligence, it had to either ask the Division Commander to task the division cavalry squadron (not likely) or it had to task its subordinate battalions to answer information requirements. This created a dilemma for the Battalion Commanders who had to balance what the brigade and their battalion needed to accomplish the mission. In the end, the battalion commander normally lost control of his scout platoons to the brigade. The need for a dedicated brigade reconnaissance asset spurred the development of the Brigade Reconnaissance Troop (BRT).

The BRT provided the Brigade Commander two platoons of HMMWV motorized cavalry soldiers and brought the total available scout assets in the brigade to five motorized cavalry platoons (two within the BRT and one within each of the three maneuver battalions). The BRT allowed the Brigade Commander to designate specific intelligence requirements without compromising their subordinate commanders' ability to accomplish their mission.

As part of a larger effort to increase command and control (C2), the Army chose to field the BRT along with a number of other digital enhancements within the brigade. The digital Army really was not much different from the legacy Army. The newly formed "digital" brigades were the same infantry and armored brigades, but enhanced with the BRT and more robust C2 capabilities to increase Situational Awareness and Situational Understanding (SA/SU). This concept was named Force XXI and the organizations became known as the Limited Conversion Division XXI, or LCD XXI for short.

The BRT first deployed in support of Operation Joint Endeavour in Bosnia and Kosovo where the motorized cavalry design proved acceptable. Mounted patrolling during peacemaking operations in a moderately developed country was well suited to the wheeled-vehicle based BRT.

Although the BRT performed well in Bosnia, the mechanized Army as a whole did not and this poor performance prompted another force structure change.

The US Army's deployment to Bosnia demonstrated that an army designed for large-scale mechanized conflict is ill-suited to rapid force projection to a Small Scale Contingency (SSC). Since participation in SSC seems to be the most probable form of contact for the US Army, it made sense to re-look the capabilities of the Army. Leading the charge was a former cavalry officer, General Shinseki. As the commander of Stabilization Force (SFOR) in Bosnia-Herzegovina, General Shinseki noted his greatest need was a capability to operate in both high and low intensity conflicts without the encumbrance of heavy platforms, especially since the majority of operations since 1991 were burdened by heavy platforms.[26] At first glance, it seemed that Operation Iraqi Freedom (OIF) provided the perfect mechanism to revalidate the mechanized core of the Army, but in reality, the initial operations reinforced the lessons of Bosnia.

### *The BRT During Operation Iraqi Freedom*

During Operation Iraqi Freedom I and II,[†] the BRT proved too light and it was incapable of performing its core missions without significant augmentation. During the approach march to

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[†] Operation Iraqi Freedom (OIF) occurred in several parts roughly segregated by the one-year anniversary of the initiation of the ground campaign. OIF I includes operations between March 2003 and March 2004 while OIF II includes operations from March 2004 to March 2005 and so forth.

Baghdad, the 3rd Infantry Division "rarely led with their organic Brigade Reconnaissance Troops because they were too slow to keep pace with the fast moving brigade."[27] The BRT was not as mobile as the mechanized battalions, they were incapable of fighting for information, and they could not operate independently for long periods of time. Additionally, they lacked survivability against the threats mechanized brigades were expected to face. The BRT was not able to perform its core function of providing the Brigade Commander "information about the threat and terrain…and to prevent the main body from being surprised and to preserve the combat power."[28] The challenge of cavalry is the fine balance between the ability to accomplish the mission and wasting combat power. The BRT validated the reconnaissance paradox- they were too light and not used (Figure 5).

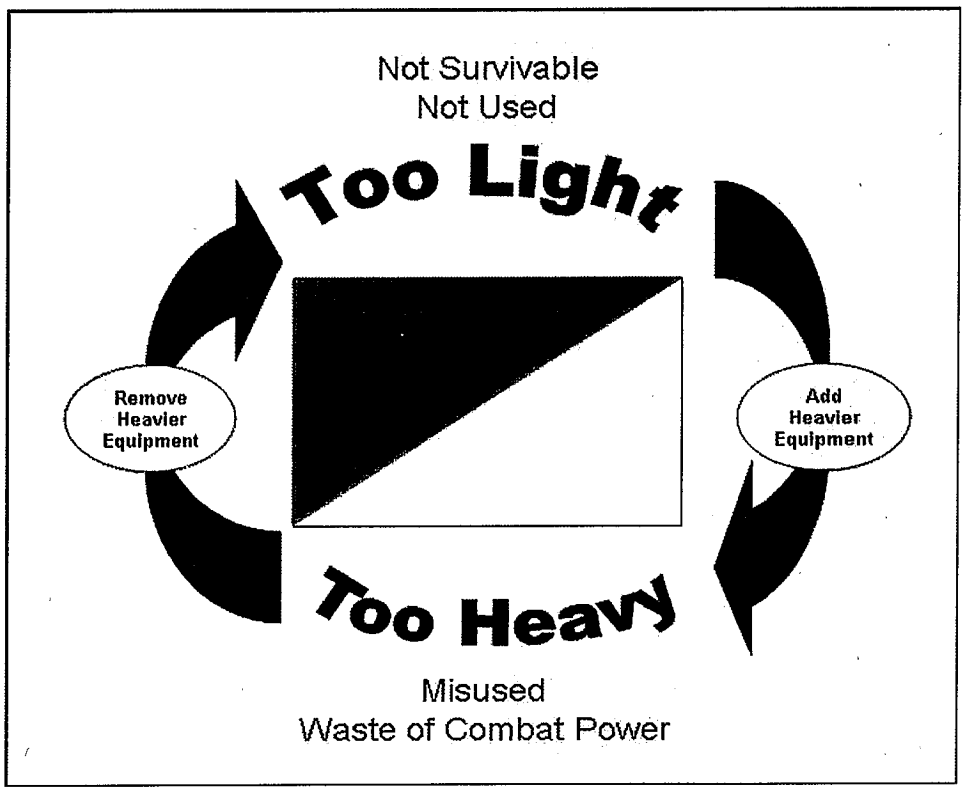



**Figure 5:** The Reconnaissance Paradox[29]

On the other hand, the 3rd Infantry Division's division cavalry squadron proved far more useful. They performed guard missions protecting the divisions' eastern flank and conducted several hasty attacks in order to place the division into a positional advantage over the enemy.[30] The accomplishments of the mechanized cavalry during OIF I was one of the main considerations behind including a mechanized cavalry organization into the Heavy Brigade Combat Team. The success of the mechanized cavalry in OIF I coupled with the success of the Stryker Brigade's Reconnaissance, Surveillance, and Target Acquisition (RSTA) Squadron solidified the Army's decision to include a cavalry squadron in each brigade. This increase in reconnaissance capability would correct a perceived deficiency at detecting enemy activities and capabilities at the brigade level.[31]

### *The ARS in Operation Iraqi Freedom*

In its first rotations to Iraq, the ARS performed commendably during Operation Iraqi Freedom and proved to be far more capable than the BRT it replaced. Nevertheless, several units reported shortfalls in their After Action Reports (AAR) that prevented the ARS from accomplishing its mission. Some of the more common criticisms are: the shortage of squad level radios, the lack of demolition equipment and training,[32] the insufficiency of the M1114 as a cavalry platform, inadequate number of dismounted scouts, and the lack of tanks organic in the ARS. Most of these issues are transitory and the local command could correct. Two concerns require Department of the Army attention to give the Brigade Commander significant combat capability- tanks in the ARS and more scouts in the scout platoons.

Although most commanders welcome the introduction of a robust cavalry capability at the brigade level, they seem to like the idea of a third maneuver element more. In the

transformation from BRT to ARS, the organization lost its reconnaissance identity and became another maneuver formation. 4th Infantry Division noted that "recon organizations conducted all of the same task sets as those found in maneuver battalions."[33] Observations from the 1st Cavalry Division during operations from October 2005 until January 2007 describe the latest employment techniques of the ARS.

The 1st Cavalry Division reports that stealthy reconnaissance is infrequent at best and asserts that designing an organization capable only of stealthy reconnaissance is a costly mistake.[34] They go on to say that "the heavy brigade combat team (HBCT) reconnaissance squadron is not organized or equipped to execute tactical tasks required by current and future full spectrum operations including counter insurgency operations."[35] Finally, the report mentions that "the lack of the third maneuver battalion is one of significant reasons why commanders and leaders have not been able to consistently see first, understand first, act first, and finish decisively. The employment of the reconnaissance squadron as a maneuver battalion eliminates the BCT's primary reconnaissance and surveillance capability."[36] Even with the increase in capability, the ARS is still insufficient because of the decrease in the number of maneuver battalions and increase in information requirements to the brigade.

The HBCT now has less combat power than it did prior to modularity. However, GEN Schoomaker, the Army Chief of Staff at the time, contends that the ARS "should be counted as a maneuver unit just like its armor and infantry counterparts."[37] This is not easily put into practice. Although unintentional, the new HBCT formation created a new dilemma for the Brigade Commander. Does the brigade exchange the reconnaissance capability for combat power or does the brigade lose the flexibility of the third maneuver unit and use the ARS primarily for reconnaissance. Current operations in Iraq suggest that the ARS is not used as a reconnaissance

element; rather, the brigade typically uses the ARS as the missing third maneuver element. Interestingly, this line of criticism seems to result from the lack of a third CAB within the brigade, not from any inherent flaw with the organization of the ARS.

The most apparent solution is to create another CAB in the brigade. But this is not realistic given fiscal, manufacturing, and personnel constraints. A more realistic solution may be the introduction of tanks into the ARS. Nevertheless, there is a danger with introducing tanks into the mechanized cavalry. The most obvious drawback is expense. Tanks are expensive to purchase, maintain, train, and deploy. The addition of another combat platform within the ARS also complicates sustainment. Although "fiscal constraints prevented the Army from designing the formation [HBCT] based on combat effectiveness and lessons of recent conflict,"[38] the lessons learned from the last eight years of combat and countless treasure expended in the Global War on Terrorism should provide a strong impetus for change.

Another common concern is the lack of dismounted scouts. Under the current Table of Organization and Equipment, each scout platoon has 30 scouts, three M3 CFVs, and five M1114. Each M3 CFV has a three-man crew and two dismounted scouts, while the M1114 has a three man crew and zero dismounted scouts. This means that the entire scout platoon only has six dismounted scouts. This is not sufficient. Units have indentified a requirement for an additional six scouts per platoon.[39]

Due to operational tempo, scout platoons rarely conduct operations as a platoon. They more than likely will conduct operations as scout sections containing either one M3 and three M1114s or two M3s and two M1114. In the best case, the section is only able to dismount four scouts. This is barely enough soldiers to provide local security. Conducting a dismounted patrol is impossible. Conversely, if the number of dismounted scouts per platoon increases by six

soldiers, each scout section could dismount between four and eight soldiers. This is enough to secure the vehicles and allow the soldiers to conduct dismounted engagement patrols, an important factor in the military's recent success in Iraq.

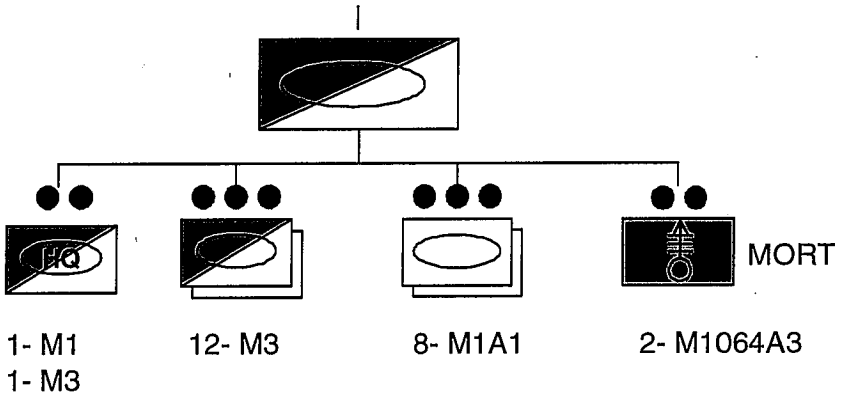



**Figure 6: Heavy Divisional Cavalry Troop**

Arguments that the ARS should not be used as a third maneuver unit are invalid. There is not a dichotomy between adding capability to the ARS and their ability to conduct reconnaissance missions. The introduction of tanks and additional scouts would actually make the squadron more capable of providing relevant information to the commander. In fact, their organization would be a hybrid of the current ARS troop and the now defunct Ground Combat Troop (GCT) of the Divisional Cavalry Squadron (Figure 6). The suggested structure for the improved Recon Troop is outlined within Figure 7. The proposed Reconnaissance Troops possess sufficient survivability, protection, firepower, and mobility to perform the full-spectrum of cavalry missions, from reconnaissance to security to deliberate attack.

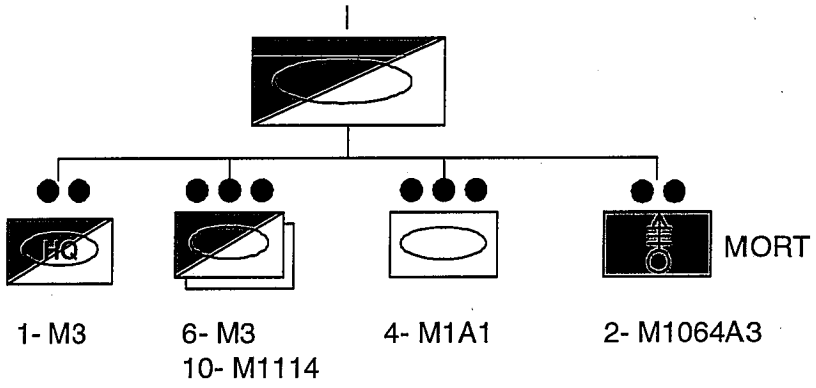



**Figure 7: Proposed ARS Reconnaissance Troop**

Reconnaissance doctrine explains the power of the combined arms cavalry organization that would exist within the ARS with tanks and additional scouts.

> Because these units are usually the forward-most elements in Major Theater of War environments, they must have the capability to survive meeting engagements and to destroy or impede threat forces as necessary to sustain operations in high-threat areas. These unique, combined arms organizations employ tanks, attack helicopters and, usually, Bradley cavalry fighting vehicles (CFV) to enhance survivability and to sustain the aggressive tempo required for operations.[40]

As a cavalry organization, the Brigade Commander should be able to assign any economy of force mission or enabling operations to the ARS and the ARS should be able to execute without additional augmentation from the brigade. The ARS must be able to perform missions as a reconnaissance force, forward security force, or a third maneuver battalion.[41] Until the modular brigade, the Army has always anticipated the requirement to fight for information simply because the friction of war prevents perfect situational awareness. To account for the uncertainty, the Army developed combined arms cavalry units that were prepared to deal with multiple enemy threats simultaneously in order to allow commanders to exploit opportunities and to secure themselves.[42] Unfortunately, this capability does not currently exist with the ARS, but it is achievable with a few adjustments.

## *Conclusions*

The US Army designed the ARS to perform reconnaissance operations where the expected enemy was a mechanized threat. Planning for this type of conflict is not wrong. It is, in fact, very prudent. Major General Larry Taylor, the Commanding General, Marine Corps Mobilization Command, during the mobilization and deployment for Operations Enduring Freedom and Iraqi Freedom provides his insights on preparing for war.

> In my lifetime, we have been in five big fights and a bunch of little ones…Complex, irregular warfare may be the most likely fight…but are you prepared to guarantee that? We had better damn well have the capability to fight the guerrilla and the nation-state, regardless of which of these is more or less likely. The risk of being unprepared to fight the nation-state is *much* greater risk than the risk of being unprepared to fight the guerrilla.[43]

History has shown that forces designed for high intensity conflict are far more adept at low intensity conflict than the converse. Nonetheless, the United States is not engaged in high--intensity, mechanized conflict. Now is the opportunity to make modifications to the ARS to provide unique and beneficial capabilities to the Brigade Commander across the full-spectrum of conflict.

Cavalry organizations exist to provide the commander with three capabilities-reconnaissance, security, and economy of force operations. However, Reconnaissance Squadrons in every type of BCT are only capable of performing one of the three core missions-reconnaissance. Given the current operational situation in Iraq and Afghanistan, this limitation is not acceptable.

Lessons learned from Operation Desert Storm and Operation Joint Forge validated a requirement for a credible cavalry capability at the brigade level. Recall the RDO concept executed by the Interim-Brigade Combat Team and verified during the Millennium Challenge

2002 exercise. The purpose of brigade reconnaissance squadrons was to gain and maintain information superiority in order to allow the commander to out-pace and out-think the enemy without the application of significant combat forces. In fact, the Executive Summary for Millennium Challenge 2002, the test bed for Rapid, Decisive Operations, states that "future operations will require decision superiority—better decisions faster."[44] Brigade level reconnaissance units exist solely to allow the primary warfighting organization in the Army, the Brigade Combat Team, to have perfect Situational Awareness and Situational Understanding (SA/SU). However, much of the doctrine, organization, and technologies required to pursue RDO simply do not exist within the Army today.

The Army's answer to the capability gap is the modular force and the centerpiece organization, the Brigade Combat Team. However, one of the primary failings of the modular design was that the HBCT traded a maneuver battalion for a cavalry squadron. Although the ARS proves far more capable than the BRT it replaced, the ARS has lost its identity and has become a poorly resourced third maneuver element. As a result, the ARS does not even perform reconnaissance missions well. Under the current construct, the ARS does not provide the brigade any unique capabilities.

Now is the time for the next evolutionary step of brigade cavalry, the inclusion of tank platoons and a significant dismount capability. The addition of one tank platoon per cavalry troop (for a total of three additional tank platoons) in the brigade will provide significant benefit. Likewise, the addition of six scouts to each scout platoon (for a total of 36 troopers per brigade) exponentially increases the capability of the ARS. With few modifications, the ARS could perform as designed- a squadron able to execute reconnaissance, security, and enabling missions

in low and high intensity conflicts to allow the commander to achieve information superiority. It is time to make the Armed Reconnaissance Squadron effective, not just efficient.

## *Endnotes*

[1] Paul Yingling, "A Failure in Generalship." *Armed Forces Journal.* (May 2007). http://www.armedforcesjournal.com/2007/05/2635198 (Accessed December 10, 2008).

[2] H.R. McMaster, "Crack in the Foundation: Defense Transformation and the Underlying Assumption of Dominant Knowledge in Future War," (Student Issue Paper, Center for Strategic Leadership, US Army War College, 2003), 56.

[3] Headquarters Department of the Army, *Cavalry Operations*, FM 17-95, (Washington DC: Headquarters Department of the Army, 24 December 1996),1-1.

[4] Headquarters Department of the Army, *Tactics*, FM 3-90, (Washington DC: Headquarters Department of the Army, 4 July 2001),13-0.

[5] As said by GEN Schoomaker in an interview with Tom Shanker, "New Chief Sets Out to Redesign a Stretched-Thin Army," New York Times, January 28, 2004.

[6] Headquarters Department of the Army, *Cavalry Operations*, FM 17-95, (Washington DC: Headquarters Department of the Army, 24 December 1996), 3-2.

[7] Headquarters Department of the Army, *Operations,* FM 3-0, (Washington DC: Headquarters Department of the Army, 27 February 2008), 7-50.

[8] Headquarters Department of the Army, *Tactics*, FM 3-90, (Washington DC: Headquarters Department of the Army, 4 July 2001), 12-0.

[9] Headquarters Department of the Army, *Tactics*, FM 3-90, (Washington DC: Headquarters Department of the Army, 4 July 2001), A-14.

[10] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 4-1.

[11] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 1-1.

[12] Clay Wilson, "Network Centric Warfare: Background and Oversight Issues for Congress," CRS Report for Congress RL32411, (Washington, DC: Congressional Research Service, June 2, 2004), 2.

[13] Terry Moon, "Net-Centric or Networked Military Operations?" *Defense & Security Analysis*, (March 2007): 58.

[14] Phillip S. Meilinger, "A History of Effects-Based Air Operations," *The Journal of Military History*, (January 2007): 139.

[15] H.R. McMaster, "Crack in the Foundation: Defense Transformation and the Underlying Assumption of Dominant Knowledge in Future War," (Student Issue Paper, Center for Strategic Leadership, US Army War College, 2003), 7.

[16] Headquarters US Joint Forces Command, *Millennium Challenge 2002 Executive Report,* (Norfolk, VA: Headquarters US Joint Forces Command, September 2003), 5.

[17] John Arquilla, *Worst Enemy: The Reluctant Transformation of the American Military,* (Chicago: Ivan R Lee, 2008), 41.

[18] Directorate of Training, Doctrine, Combat Development, and Experimentation, *Armor / Cavalry Reference Data Brigade Combat Teams*, FKSM 71-8, (Fort Knox, KY: Directorate of Training, Doctrine, Combat Development, and Experimentation, April 2008), Annex A.

[19] Headquarters Department of the Army, *Combined Arms Battalion*, FM 3-90.5, (Washington DC: Headquarters Department of the Army, 7 April 2008), 2-1 – 2-3.

[20] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 1-11.

[21] This table is the combination of information found at the Army Force Management website. Headquarters US Army Force Management, Armed Reconnaissance Squadron Personnel Table of Organization. https://www.usafmsardd.army.mil/unprotected/splash/welcome.asp (accessed 22 Dec 2007) and Headquarters US Army Force Management, Armed Reconnaissance Squadron Equipment Table of Organization, https://www.usafmsardd.army.mil/unprotected/splash/welcome.asp (accessed 22 Dec 2007).

[22] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), x-xi.

[23] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 1-14.

[24] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 1-14 – 1-15.

[25] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 1-15.

[26] Eric K. Shenseki, "Interview with General Eric K. Shenseki," By Frontline on Public Broadcast System. http://www.pbs.org/wgbh/pages/frontline/shows/future/interviews/shinseki.html (accessed on 19 January 2009).

[27] Christopher Connolly, "Reconstructing the Cavalry Force." *Armor Magazine*. (Sept-OCT 2004): 16.

[28] Headquarters Department of the Army, *Reconnaissance Squadron,* FM 3-20.96, (Washington DC: Headquarters Department of the Army, 20 September 2006), 4-2.

[29] John J. McGrath, *Scouts Out! The Development of Reconnaissance Units in Modern Armies,* (Fort Leavenworth, KS: Combat Studies Institute, 2008), 199.

[30] Michael R. Gordon and General Bernard E. Trainor, *Cobra II: The Inside Story of the Invasion and Occupation of Iraq,* (New York, NY: Pantheon Books, 2006), 215-233.

[31] John J. McGrath, *Scouts Out! The Development of Reconnaissance Units in Modern Armies,* (Fort Leavenworth, KS: Combat Studies Institute, 2008), 180.

[32] Center for Army Lessons Learned, "06-10: 3ID Modular Force Assessment Initial Impressions Report," (Fort Leavenworth, KS: Center for Army Lessons Learned, 26 November 2006) part 12. https://call2.army.mil/toc.asp?document=89 (accessed 22DEC08).

[33] Center for Army Lessons Learned, "4ID Initial Impressions Report from a Modular Division in OIF," (Fort Leavenworth, KS: Center for Army Lessons Learned, 26 November 2006), part 11.5. https://call2.army.mil/toc.asp?document=3183 (accessed 22DEC08).

[34] Center for Army Lessons Learned, "25th Infantry Division and 1st Cavalry Division Initial Impressions Report," (Fort Leavenworth, KS: Center for Army Lessons Learned, September 2007), 34.

[35] Center for Army Lessons Learned, "25th Infantry Division and 1st Cavalry Division Initial Impressions Report," (Fort Leavenworth, KS: Center for Army Lessons Learned, September 2007), 9.

[36] Center for Army Lessons Learned, "25th Infantry Division and 1st Cavalry Division Initial Impressions Report," (Fort Leavenworth, KS: Center for Army Lessons Learned, September 2007), 11.

[37] Elaine M. Grossman, "Critique of Army Resign Proves Highly Contentious Inside Service." InsideDefense.com. March 2, 2006.

[38] Elaine M. Grossman, "Critique of Army Resign Proves Highly Contentious Inside Service." InsideDefense.com. March 2, 2006.

[39] Center for Army Lessons Learned, "25th Infantry Division and 1st Cavalry Division Initial Impressions Report," (Fort Leavenworth, KS: Center for Army Lessons Learned, September 2007), 9.

[40] Headquarters Department of the Army, *Reconnaissance Platoon*, FM 3-20.98, (Washington DC: Headquarters Department of the Army, 2 December 2002), 1-2.

[41] Center for Army Lessons Learned, "25th Infantry Division and 1st Cavalry Division Initial Impressions Report," (Fort Leavenworth, KS: Center for Army Lessons Learned, September 2007), 33.

[42] H.R. McMaster, "Crack in the Foundation: Defense Transformation and the Underlying Assumption of Dominant Knowledge in Future War," (Student Issue Paper, Center for Strategic Leadership, US Army War College, 2003), 55.

[43] Tom Ricks, "Tom Ricks's Inbox," *Washington Post*, 1 February 2009, Northern Virginia Home Edition, B2.

[44] Headquarters US Joint Forces Command, *Millennium Challenge 2002 Executive Report,* (Norfolk, VA: Headquarters US Joint Forces Command, September 2003), 9.

## *Bibliography*


Adams, Thomas K. *The Army After Next: The First Postindustrial Army.* Westport, Connecticut, Praeger Security International, 2006.

Arquilla, John. *Worst Enemy: The Reluctant Transformation of the American Military.* Chicago: Ivan R Lee, 2008.

Center for Army Lessons Learned. "Initial Impressions Report: Operation Joint Endeavor." Fort Leavenworth, KS: Center for Army Lessons Learned, March 1997.

Center for Army Lessons Learned. "25th Infantry Division and 1st Cavalry Division Initial Impressions Report." Fort Leavenworth, KS: Center for Army Lessons Learned, September 2007.

Center for Army Lessons Learned. "06-10: 3ID Modular Force Assessment Initial Impressions Report." Fort Leavenworth, KS: Center for Army Lessons Learned, 26 November 2006. https://call2.army.mil/toc.asp?document=89 (accessed 22DEC08)

Center for Army Lessons Learned. "4ID Initial Impressions Report from a Modular Division in OIF." Fort Leavenworth, KS: Center for Army Lessons Learned, 26 November 2006. https://call2.army.mil/toc.asp?document=3183 (accessed 22DEC08)

Connolly, Christopher. "Reconstructing the Cavalry Force." *Armor Magazine.* (Sept-OCT 2004): 16-20.

Center of Military History. *Bosnia-Herzegovina: The U.S. Army's Role in Peace Enforcement Operations 1995-2004.* Washington, DC: 2005.

Directorate of Training, Doctrine, Combat Development, and Experimentation. *Armor / Cavalry Reference Data Brigade Combat Teams.* FKSM 71-8. Fort Knox, KY: Directorate of Training, Doctrine, Combat Development, and Experimentation, April 2008.

Cordesman, Anthony H. *The Iraq War: Strategy, Tactics, and Military Lessons.* Washington, DC: Center for Strategic and International Studies, 2003.

Dooley, Matthew A. "Ignoring History: The Flawed Effort to Divorce Reconnaissance for Security in Modern Cavalry Transformation." Master's Thesis, US Army Command and General Staff College, 2006.

Gompert, David C. and John Gordon IV. "War by Other Means: Building Complete and Balanced Capabilities for Counterinsurgency." For the Office of the Secretary of Defense by Rand Corporation, 2008.

Gordon, Michael R. and General Bernard E. Trainor. *Cobra II: The Inside Story of the Invasion and Occupation of Iraq.* New York, NY: Pantheon Books, 2006.

Grossman, Elaine M. "Critique of Army Resign Proves Highly Contentious Inside Service." InsideDefense.com. March 2, 2006.

Headquarters Department of the Army. *Operations.* FM 3-0. Washington DC: Headquarters Department of the Army, 27 February 2008.

Headquarters Department of the Army. *The Modular Force.* FMI 3-0.1. Washington DC: Headquarters Department of the Army, January 2008.

Headquarters Department of the Army. *Stability Operations.* FM 3-7. Washington DC: Headquarters Department of the Army, 6 October 2008.

Headquarters Department of the Army. *Tactics.* FM 3-90. Washington DC: Headquarters Department of the Army, 4 July 2001.

Headquarters Department of the Army. *Cavalry Operations.* FM 17-95. Washington DC: Headquarters Department of the Army, 24 December 1996.

Headquarters Department of the Army. *Reconnaissance Squadron.* FM 3-20.96. Washington DC: Headquarters Department of the Army, 20 September 2006.

Headquarters Department of the Army. *Reconnaissance Platoon.* FM 3-20.98. Washington DC: Headquarters Department of the Army, 2 December 2002.

Headquarters Department of the Army. *Combined Arms Battalion.* FM 3-90.5. Washington DC: Headquarters Department of the Army, 7 April 2008.

Headquarters Department of the Army. *The Brigade Combat Team.* FM 3-90.6. Washington DC: Headquarters Department of the Army, 4 August 2006.

Headquarters Department of the Army. White Paper on- *Concepts for the Objective Force.* Washington DC: Headquarters Department of the Army.

Headquarters US Army Training and Doctrine Command. *Army Comprehensive Guide to Modularity Version 1.0.* Fort Monroe, VA: Headquarters US Army Training and Doctrine Command, 8 October 2004.

Headquarters US Army Force Management. Armed Reconnaissance Squadron Personnel Table of Organization.

https://www.usafmsardd.army.mil/unprotected/splash/welcome.asp (accessed 22 Dec 2007).

Headquarters US Army Force Management. Armed Reconnaissance Squadron Equipment Table of Organization. https://www.usafmsardd.army.mil/unprotected/splash/welcome.asp (accessed 22 Dec 2007).

Headquarters US Joint Forces Command. *Millennium Challenge 2002 Executive Report.* Norfolk, VA: Headquarters US Joint Forces Command, September 2003.

Kasales, Michael C. "Reconnaissance and Security Forces in the New Heavy Division Structure." *Armor Magazine.* (March-April 2000): 26-29.

Kirkpatrick, Charles E. *Ruck It Up! The Post-Cold War Transformation of V Corps, 1990-2001.* Washington, DC: Department of the Army, 2006.

Lind, William S, and Keith Nightengale, John F Schmitt, Joseph W Sutton and Gary I Wilson. "Changing the face of war: Into the fourth generation." *Marine Corps Gazette*, (November 2001): 65-68.

Mandeles, Mark D. *Military Transformation Past and Present.* Westport, Connecticut, Praeger Security International, 2007.

McGrath, John J. *An Army at War: Change in the Midst of Conflict.* Fort Leavenworth, KS: Combat Studies Institute, 2005.

McGrath, John J. *Scouts Out! The Development of Reconnaissance Units in Modern Armies.* Fort Leavenworth, KS: Combat Studies Institute, 2008.

McMaster, H.R. "Crack in the Foundation: Defense Transformation and the Underlying Assumption of Dominant Knowledge in Future War." Student Issue Paper, Center for Strategic Leadership, US Army War College, 2003.

Meilinger, Phillip S. "A History of Effects-Based Air Operations." *The Journal of Military History*, (January 2007): 139-167.

Mullins, J. B. "Defining the Core Competencies of U.S. Cavalry." Master's Thesis, US Army Command and General Staff College, 2004.

Moon, Terry. "Net-Centric or Networked Military Operations?" *Defense & Security Analysis*, (March 2007): 55-67.

Ricks, Tom. "Tom Ricks's Inbox." *Washington Post,* 1 February 2009, Northern Virginia Home Edition, B2.

Perry, Walter L, and Marc Dean Millot. *Issues from the 1997 Army After Next Winter Wargame*. Washington, DC: RAND, 1998.

Peters, Ralph. *Never Quit the Fight*. Mechanicsburg, PA: Stackpole Books, 2006.

Shenseki, Eric K. "Interview with General Eric K. Shenseki." By Frontline on Public Broadcast System. http://www.pbs.org/wgbh/pages/frontline/shows/future/interviews/shinseki.html (accessed on 19 January 2009).

Shanker, Tom. "New Chief Sets Out to Redesign a Stretched-Thin Army." New York Times. January 28, 2004.

Taylor, Curtis D. "The Transformation of Reconnaissance: Who Will Fight for Information on the Future Battlefield?" Master's Thesis, US Army Command and General Staff College, 2005.

Vandergriff, Donald E, ed. *The American Cost of Battle in the 21st Century*. Novato, CA: Presido Press, 2001.

Wilson, Clay. "Network Centric Warfare: Background and Oversight Issues for Congress." CRS Report for Congress RL32411. Washington, DC: Congressional Research Service, June 2, 2004.

Yingling, Paul. "A Failure in Generalship." *Armed Forces Journal*. (May 2007). http://www.armedforcesjournal.com/2007/05/2635198 (Accessed December 10, 2008).

Zahn, Brian R. "The Future Combat System: Minimizing Risk While Maximizing Capability." Strategy Research Project, US Army War College, 2000.

*Appendix A: ARS Personnel and Equipment MTOE Diagrams*

**FKSM 71-8 (8 April 2007)**

# HHT, Reconnaissance Squadron, HBCT

17206G100
OFF: 22/WO: 0/ENL: 115/TOTAL: 137

## COMMAND GROUP PARA 01

AN/VRC-92F
AN/GRC-193A +
AN/PRC-119F
DAGR
EPLRS-V1
AN/PSC-5
AN/GYK-51
AN/PYQ-6C

LTC 02B00 (COMMANDER) P
SSG 19D30 (VEH CDR) P
SGT 19D20 (CFV GUNNER) P
SP4 19D10 (CFV DRIVER) P

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

*LTC 02B00 (COMMANDER) **
PFC 19D10 (VEH DRIVER) C

** WHEN NOT MOUNTED IN CFV*

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

*MAJ 15C00 (EXEC OFF) P*
PFC 19D10 (VEH DRIVER) C

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

CSM 00Z50 (CSM) P

## CURRENT OPS - INTEL/S2 PARA 02

AN/VRC-92F
2 AN/TYQ-93
FBCB2
DAGR
EFLRS-V1
AN/PSC-5

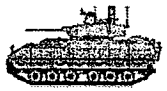
CPT 35D00 (S2) C

AN/VRC-92F
AN/GRC-193A +
AN/TYQ-93
AN/TYQ-93(V)2
FBCB2
FHMUX
DAGR
EPLRS-V1

LT 35D00 (ASST S2) C
SFC 19D30 (SR INTEL SGT) C
SSG 35F30 (INTEL SGT) C
2 SGT 35F20 (INTEL ANALYST) C
2 SP4 35F10 (INTEL ANALYST) C
2 PFC 35F10 (INTEL ANALYST) C

## CURRENT OPS – OPS/S3 PARA 03

AN/VRC-92F
AN/GRC-193A +
AN/PRC-119F
EPLRS-V1
AN/MYQ-10(V)1
AN/PYQ-6C



*MAJ 19C00 (S3) P*
SSG 19D30 (VEH CDR) P
SGT 19D20 (CFV GUNNER) P
SP4 19D10 (CFV DRIVER) P

AN/VRC-92F
AN/GRC-193A +
FBCB2
AN/UXC-10 FAX
DAGR
EFLRS-V1
AN/PSC-5
AN/MYQ-10(V)1
3 AN/PYQ-6C


2 CPT 19C00 (ASST S3) C
LT 74B00 (CHEM OFF) C
2 SFC 19D30 (ASST OPNS SGT) C
SP4 19D10 (CARRIER DRIVER) C

AN/VRC-92F

SSG 74D30 (NBC NCO) C
2 SGT 19D20 (OPNS ASST) C

AN/VRC-91F
FBCB2
DAGR
EPLRS-V1


SGM 19Z50 (OPNS SGT) C
PFC 19D10 (VEH DRIVER) C

AN/VRC-92F
FBCB2
DAGR
EFLRS-V1

*MAJ 19C00 (SQDN S3) **
PFC 19D10 (VEH DRIVER) C

** WHEN NOT MOUNTED IN CFV*

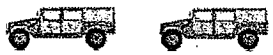
## CURRENT OPS - FIRE SUPPORT PARA 04

2 AN/VRC-92F
AN/GRC-193A +
AN/GYK-43
DAGR
AN/GYK-43(V)1

CPT 13A00 (FIRE SPT OFFICER) C
LT 13A00 (ASST EFFECTS COORD) C
SFC 13F30 (FIRE SPT SGT) C
SFC 13F30 (TARGETING NCO) C
SGT 13F20 (FIRE SPT SGT) C
2 SP4 13F10 (FIRE SPT SP) C

## CURRENT OPS – FS/TACP PARA 05

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1
AN/GYK-56

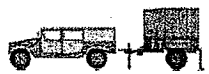


*CPT 01A00 (USAF STAFF OFF) C **
*SSG 00D30 (USAF STAFF NCO) C **
*SP4 00D10 (USAF STAFF ENL) C **

** USAF PERSONNEL*

## SUSTAINMENT - S1 PARA 06

AN/VRC-90F
DAGR
OL-760/TYQ
5 AN/TYQ-116(V)3



CPT 42B00 (S1) C
SFC 42A30 (SR HUMAN RES SGT) C
SSG 42A30 (HUMAN RES SGT) C
2 SGT 42A20 (HUMAN RES SGT) C
SP4 27D10 (PARALEGAL SP) C
SP4 42A10 (HUMAN RES SP) C
2 PFC 42A10 (HUMAN RES SP) C

# HHT, Recon Sqdn, HBCT (cont)

## SUSTAINMENT - S4 PARA 07

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

CPT 19C00 (S4) C

AN/VRC-92F
AN/VRC-90F
AN/GRC-103A +
FBCB2
2 AN/TYQ-129(V)2
AN/TYQ-109(V)1
AN/UYQ-90(V)3
KG-175
FHMUX
AN/TYQ-95
DAGR
EPLRS-V1
AN/MYQ-10(V)1
GL-701/TYQ
AN/PYQ-5C


SFC 92Y30 (SUPPLY SGT) C
SGT 92Y20 (ASST SUPPLY SGT) C

AN/VRC-93F

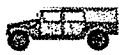
## SUSTAINMENT - UNIT MINISTRY TEAM PARA 08

AN/VRC-90F
FBCB2
DAGR
EPLRS-V1

CPT 56A00 (CHAPLAIN)
SGT 56M20 (CHAPLAIN ASST NCO) C

## SUSTAINMENT – C4 OPS/S6 PARA 09

AN/VRC-90F
FBCB2
AN/UYQ-90(V)3
DAGR
EPLRS-V1



CPT 25A00 (S6) C

AN/VRC-92F
DAGR
EPLRS-V1
AN/TSR-8 (GRT)
AN/GYK-50B (ISYSCON)(V)4
AN/PYQ-12
AN/TSQ-248 (CMD CNTR SYS)
AN/GRC-252

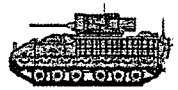
SFC 25U30 (SECTION CHIEF) C
SP4 25B10 (LAN MGR) C
PFC 25B10 (LAN MGR) C
PFC 25U10 (SGNL SPT SYS SP) C

BCP (SWITCHING GP): OM-87A/T

SGT 25Q20 (SR XMSN SYS OPR-MNT) C
SP4 25Q10 (XMSN SYS OPR-MNT) C

## FIRE SUPPORT PLATOON PARA 10

AN/VRC-92F
AN/VRC-87F
FBCB2
AN/PSG-11(V)1
DAGR
EPLRS-V1
AN/PED-1 (LLDR)
AN/PSG-10(V)
AN/GYK-51

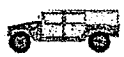


LT 13A00 (FSO) C
SSG 13F30 (FIRE SPT SGT) C
SP4 13F10 (FIRE SPT SP) C
PFC 13F10 (RATELO) C

X3

## RETRANS SECTION (3 TEAMS) PARA 11

2 AN/VRC-92F
FBCB2
DAGR
2 EPLRS-V1



SGT 25U20 (TEAM CHIEF) C
SP4 25U10 (RDO RTRNS OPR) C
PFC 25U10 (RDO RTRNS OPR) C

X3

## TROOP HEADQUARTERS PARA 12

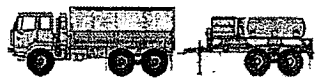
AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

CPT 19C00 (COMMANDER) P
LT 19C00 (EXEC OFF) C
PFC 19D10 (VEH DRIVER) C

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

15G 19Z50 (FIRST SERGEANT) C
PFC 19D10 (VEH DRIVER) C

AN/VRC-90F
FBCB2
AN/TYQ-109(V)2
DAGR
EPLRS-V1
GL-700/TYQ



SSG 92Y30 (SUPPLY SGT) C
SP4 92Y10 (ARMORER) C

SP4 74D10 (DECON SP) C

# HHT, Recon Sqdn, HBCT (cont)

## MEDICAL TREATMENT PLT HQ PARA 13

AN/VRC-89F
FSCB2
DAGR
EPLRS-V1
CL-700/TYQ

LT 70B67 (FIELD MED ASST) C
SFC 68W40 (PLT SGT) C

## MEDICAL TREATMENT SQUAD PARA 14

AN/VRC-89F
AN/TYQ-107(V)1
AN/TYQ-105(V)1
FSCB2
4 AN/TYQ-105(V)1
DAGR
EPLRS-V1

CPT 62B00 (FIELD SURGEON) P
SSG 68W30 (HEALTH CARE SGT) C
PFC 68W10 (HEALTH CARE SP) C

AN/VRC-89F
AN/TYQ-105(V)1
FSCB2
4 AN/TYQ-105(V)1
DAGR
EPLRS-V1

CPT 65D00 (PHYSICIAN ASST) P
SGT 68W20 (HEALTH CARE SGT) C
SP4 68W10 (HEALTH CARE SP) C

SGT 68W20 (HEALTH CARE SGT) C
PFC 68W10 (HEALTH CARE SP) C

## (X4) AMBULANCE SQUAD PARA 15

AN/VRC-90F
FSCB2
3 AN/TYQ-105(V)1
DAGR
EPLRS-V1

SGT 68W20 (EMERG CARE SGT) P
SP4 68W10 (AMB AIDE / DRIVER) P
PFC 68W10 (AMB AIDE / DRIVER) P

AN/VRC-90F
FSCB2
3 AN/TYQ-105(V)1
DAGR
EPLRS-V1

SGT 68W20 (EMERG CARE SGT) P
SP4 68W10 (AMB AIDE / DRIVER) P
PFC 68W10 (AMB AIDE / DRIVER) P

X4

## COMBAT MEDIC SECTION PARA 16

AN/TYQ-105(V)1
12 AN/TYQ-105(V)1

3 SSG 68W30 (SECTION NCO) P
9 SP4 68W10 (COMBAT MEDIC) P

# Summary of Equipment

## WEAPONS

| | |
|---|---|
| LAUNCHER GRENADE 40MM M203A2 | 7 |
| MACHINE GUN .50CAL HB FLEX | 2 |
| MACHINE GUN 7.62MM M240C | 5 |
| MACHINE GUN 7.62MM M240B | 5 |
| PISTOL 9MM AUTOMATIC M9 | 49 |
| RIFLE 5.56MM M4 CARBINE | 88 |

## VEHICLES, TRAILERS, AND TRLR MTD SYSTEMS

| | |
|---|---|
| CARRIER ARMORED COMMAND POST: (M1068) | 1 |
| CARRIER PERSONNEL FT ARMORED (RISE) (M113A3) | 8 |
| CARRIER COMMAND POST LT TRACKED: (M577A1) | 3 |
| FIRE SUPPORT TEAM VEHICLE: BRADLEY (M7 BFIST) | 3 |
| FIGHTING VEHICLE FT CAVALRY M3A3 | 2 |
| TRUCK UTILITY: HVY VARIANT HMMWV (M1097A2) | 2 |
| TRUCK UTILITY ECV: ARMAMENT CARRIER M1151A1 | 1 |
| TRUCK CARGO: MTV (M1083) | 2 |
| TRUCK CARGO: 5X4 LMTV (M1078) | 3 |
| TRUCK UTILITY: CGO/TRP CARRIER 1-1/4T HMMWV (M998) | 17 |
| LIGHT TACTICAL TRAILER: 3/4T (M1101) | 5 |
| TRAILER CARGO: LMTV W/DROPSIDES (M1082) | 1 |
| SICPS TLR MTD SUPPORT SYS 20KW 5 TON ECU: (MED TMSS) | 2 |
| POWER PLANT 15 KW ELECTRIC TM: AN/MJQ-48 | 1 |
| TRAILER TANK WATER (CAMEL) 800 GAL 5 TON | 1 |

## MISCELLANEOUS EQUIPMENT

| | |
|---|---|
| DECON APPARATUS LT WEIGHT | 2 |
| GEN SET TACT QUIET: 3KW 60 HZ (MEP-831A) | 5 |
| MUNITION: NETWORK COMMAND (SPIDER) | 1 |
| SMALL UNMANNED AIRCRAFT SYSTEM: (SUAS) RAVEN B | 2 |

## NIGHT VISION/OBSERVATION EQUIPMENT

| | |
|---|---|
| DRIVERS VISION ENHANCER AN/VAS-5 | 24 |
| MINI EYESAFE LASER INFRARED OBSN DEVICE: (MELIOS) | 3 |
| MONOCULAR NIGHT VISION DEVICE (MNVD) AN/PVS-14 | 8 |
| NIGHT VISION GOGGLES: AN/PVS-7B | 102 |
| RANGE FINDER-TGT DESIGNATOR: LASER AN/PED-1 (LLDR) | 3 |
| MEDIUM THERMAL WEAPONS SIGHT: AN/PAS-13(V2) | 4 |
| HEAVY THERMAL WEAPONS SIGHT: AN/PAS-13(V3) | 2 |

## COMMUNICATION-ELECTRONICS EQUIPMENT

| | |
|---|---|
| ALL SOURCE ANALYSIS SYSTEM: AN/TYQ-93 (ASAS-LT) | 3 |
| ALL SOURCE ANALSIS SYSTEM: AN/TYQ-93(V)2 (ASAS-IFS) | 1 |
| ANTENNA GROUP: OE-254 | 36 |
| COMPUTER SET: AN/GYK-57 (AFATDS – SINGLE) | 1 |
| COMPUTER SYSTEM DIGITAL: AN/TYQ-107(V)1 (MCS-3A) | 1 |
| COMPUTER SYSTEM DIGITAL: AN/TYQ-106(V)1 | 3 |
| COMPUTER SET DIGITAL: AN/UYK-128 (FBCB2) | 33 |
| COMPUTER SYS DIGITAL: AN/TYQ-129(V)2 (TC-AIMS II WS) | 2 |
| COMPUTER SYSTEM DIGITAL: AN/TYQ-105(V)1 (MCS-1) | 11 |
| COMPUTER SET DIGITAL: AN/TYQ-109(V)1 (GCSS-A (V)1) | 1 |
| COMPUTER SET DIGITAL: AN/TYQ-109(V)2 (GCSS-A (V)2) | 1 |
| COMPUTER SYSTEM DIGITAL: AN/UYQ-90(V)3 (MITS-CS) | 1 |
| DIGITAL DATA SET: AN/PSG-11(V)1 | 3 |
| ENCRYPT/DECRYPT EQUIPMENT: TACLANE KG-175 | 2 |
| FACSIMILE SET: AN/UXC-10 | 1 |
| FREQUENCY HOPPING MULTIPLEXER: TF-1456VRC (FHMUX) | 2 |
| RADIO SET: HF AN/GRC-193A | 6 |
| INTERROGATOR SET AN/TYQ-95 (TC-AIMS II INTERROGATOR) | 1 |
| NAVIGATION SET: SATELLITE SIGNALS AN/PSN-13 (DAGR) | 37 |
| PJH SURFACE VEH RADIO SET: AN/VSQ-2(V)1 (EPLRS-V1) | 39 |
| RADIAC SET: AN/VDR-2 | 23 |
| RECEIVE SUITE: AN/TSR-8 (GRT) | 1 |
| RADIO SET: AN/VRC-87F | 3 |
| RADIO SET: AN/VRC-89F | 4 |
| RADIO SET: AN/VRC-90F | 15 |
| RADIO SET: AN/VRC-91F | 1 |
| RADIO SET: AN/VRC-92F | 25 |
| RADIO SET: AN/PSC-5 | 6 |
| RADIO SET: AN/PRC-119F | 2 |
| PROCESSOR GROUP SIGNAL DATA: OL-700/TYQ | 3 |
| COMPUTER SYSTEM DIGITAL: AN/PSG-10(V) (PFED) | 3 |
| COMPUTER SET FA GENERAL: AN/GYK-56 (EMT) | 1 |
| COMPUTER SYSTEM DIGITAL: AN/GYK-50B (ISYSCON) (V4) | 1 |
| BATTALION COMMAND POST (SWITCHING GROUP): OM-57A/T | 1 |
| COMPUTER SET DIGITAL: AN/PYQ-12 (MCS GATEWAY SVR) | 1 |
| COMMAND CENTER SYSTEM: AN/TSQ-243 | 1 |
| INTERCOMMUNICATIONS SYSTEM: AN/GRC-252 | 1 |
| COMMAND POST OF THE FUTURE (CPOF) WS: AN/MYQ-10(V)1 | 3 |
| COMPUTER SET FA GENERAL: AN/GYK-51 (FOS) | 4 |
| COMPUTER SET FA GENERAL: AN/GYK-48(V)1 (FSCOORD) | 1 |
| COMP SYS DIGITAL: (AHRS) AN/TYQ-116(V)3 | 5 |
| PROCESSOR GROUP SIGNAL DATA: OL-701/TYQ | 1 |
| COMPUTER SYSTEM DIGITAL: AN/PYQ-6C | 6 |

HHT, Reconnaissance Squadron, HBCT

# Recon Troop, Recon Sqdn, HBCT

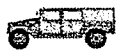
17207G000
OFF: 4/WO: 0/ENL: 78/TOTAL: 82

## TROOP HEADQUARTERS PARA 01

AN/VRC-92F
AN/PRC-119F
FHMUX
EPLRS-V1

CPT 19C00 (COMMANDER) P
SGT 19D20 (CFV GUNNER) P
SP4 19D10 (CFV DRIVER) P

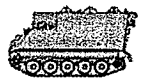
AN/VRC-92F
FBCB2
DAGR
EPLRS-V1



*CPT 19C00 (COMMANDER) P **
PFC 19D10 (VEH DRIVER) C

*WHEN NOT MOUNTED IN CFV OR CP VEHICLE

AN/VRC-92F
AN/VRC-90F
AN/GRC-193A +
FBCB2
AN/UXC-1B FAX
FHMUX
DAGR
EPLRS-V1



LT 19C00 (EXEC OFF) C
SSG 19D30 (OPNS NCO) C
SGT 25U20 (FWD SIG SPT NCO) C
SGT 74D20 (NBC NCO) C
SP4 19D10 (CARRIER DRIVER) C

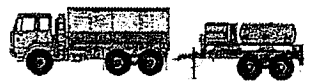
AN/VRC-90F

*LT 19C00 (EXEC OFF) **

AN/VRC-92F
FBCB2
DAGR
EPLRS-V1

1SG 19Z50 (FIRST SERGEANT) C
SP4 19D10 (CARRIER DRIVER) C

AN/VRC-90F
FBCB2
AN/TYQ-100(V)2
DAGR
OL-791/TYQ



SGT 92Y20 (SUPPLY SGT) C
SP4 92Y10 ARMORER) C

## MORTAR SECTION PARA 02

AN/VRC-92F
FBCB2
DAGR

SFC 11C40 (SECTION LDR) C

AN/VRC-91F
FBCB2
DAGR
EPLRS-V1
M95 MFCS

SSG 11C30 (SQUAD LEADER) C
SP4 11C10 (CARRIER DRIVER) C
SP4 11C10 (GUNNER) C
PFC 11C10 (ASST GUNNER) C

X2

## (X2) RECCE PLATOON PARA 03

AN/VRC-92F
AN/GRC-193A +
AN/PRC-119F
FBCB2
DAGR
EPLRS-V1
AN/PRC-119F
LRAS3

LT 19C00 (PLT LDR) C
SGT 19D2G (TEAM LDR) C
SP4 19D10 (SCOUT DRIVER) C

AN/VRC-92F
AN/GRC-193A +
AN/PRC-119F
FBCB2
DAGR
EPLRS-V1
AN/PRC-119F
LRAS3

SFC 19D40 (PLT SGT) C
SGT 19D2G (TEAM LDR) C
SP4 19D10 (SCOUT DRIVER) C

AN/VRC-92F
AN/GRC-193A
AN/PRC-119F
EPLRS-V1

SSG 19D30 (SECTION LDR) P
SGT 19D20 (CFV GUNNER) P
SP4 19D10 (SCOUT) C
SP4 19D10 (CFV DRIVER) P
PFC 19D10 (SCOUT) C

X3

AN/VRC-88F
AN/PRC-119F
FBCB2
DAGR
EPLRS-V1
LRAS3

SSG 19D30 (SQUAD LDR) C
SP4 19D10 (SCOUT DRIVER) C
PFC 19D10 (SCOUT) C

X3

X2

# Summary of Equipment

## WEAPONS

| | |
|---|---|
| COMMAND AND LAUNCH UNIT (JAVELIN) | 6 |
| GRENADE LAUNCHER: 40MM M203A2 | 10 |
| MACHINE GUN .50CAL HB FLEX | 10 |
| MORTAR 120MM | 2 |
| MACHINE GUN GRENADE 40MM MK-19 MOD III | 4 |
| MACHINE GUN 7.62MM M240C | 7 |
| MACHINE GUN 7.62MM M240B | 16 |
| PISTOL 9MM AUTOMATIC M9 | 21 |
| RIFLE 5.56MM M4 CARBINE | 61 |
| MODULAR ACCESSORY SHOTGUN SYSTEM XM26 | 12 |

## VEHICLES, TRAILERS, AND TRLR MTD SYSTEMS

| | |
|---|---|
| CARRIER 120MM MORTAR: SP ARMORED (M1064) | 2 |
| CARRIER ARMORED COMMAND POST: (M1068) | 1 |
| CARRIER PERSONNEL FT ARMORED (RISE) (M113A3) | 1 |
| FIGHTING VEHICLE: FT CAVALRY M3A3 | 7 |
| TRUCK UTILITY EXP CAPACITY: ARMAMENT CARRIER M1151 | 10 |
| TRUCK CARGO: MTV (M1083) | 1 |
| TRUCK UTILITY: CGO/TRP CARRIER 1-1/4T HMMWV (M998) | 3 |
| TRAILER TANK WATER (CAMEL) 800 GAL 5 TON | 1 |

## MISCELLANEOUS EQUIPMENT

| | |
|---|---|
| GEN SET: DED SKID MTD 5 KW 60HZ (MEP-802A) | 1 |
| MUNITION: NETWORK COMMAND (SPIDER) | 1 |
| SAW CHAIN: GAS DRVN BAR FRAME | 4 |
| SMALL UNMANNED AIRCRAFT SYSTEM: (SUAS) RAVEN B | 1 |

## COMMUNICATION-ELECTRONICS EQUIPMENT

| | |
|---|---|
| ANTENNA GROUP: OE-254 | 6 |
| COMPUTER SET DIGITAL: AN/UYK-12S (FBCB2) | 17 |
| COMPUTER SET DIGITAL: AN/TYQ-109(V)2 (GCSS-A (V)2) | 1 |
| FACSIMILE SET: AN/UXC-10 | 1 |
| FREQUENCY HOPPING MULTIPLEXER: TF-1456VRC (FHMUX) | 2 |
| RADIO SET: HF AN/GRC-193A + | 11 |
| MORTAR FIRE CONTROL SYSTEM: M95 | 2 |
| NAVIGATION SET: SATELLITE SIGNALS AN/PSN-13 (DAGR) | 17 |
| PJH SURFACE VEH RADIO SET: AN/VSQ-2(V)1 (EPLRS-V1) | 22 |
| RADIAC SET: AN/VDR-2 | 4 |
| RADIO SET: AN/VRC-89F | 6 |
| RADIO SET: AN/VRC-90F | 3 |
| RADIO SET: AN/VRC-91F | 2 |
| RADIO SET: AN/VRC-92F | 15 |
| RADIO SET: AN/PRC-119F | 17 |
| PROCESSOR GROUP SIGNAL DATA: OL-700/TYQ | 1 |

## NIGHT VISION/OBSERVATION EQUIPMENT

| | |
|---|---|
| DRIVERS VISION ENHANCER: AN/VAS-5 | 14 |
| MINI EYESAFE LASER IR OBS SET: AN/PVS-6 (MELIOS) | 8 |
| MONOCULAR NIGHT VISION DEVICE: AN/PVS-14 | 32 |
| NIGHT VISION GOGGLES: AN/PVS-7B | 46 |
| RANGE FINDER-TGT DESIGNATOR: LASER AN/PED-1 (LLDR) | 4 |
| SURVEILLANCE SYS: SCOUT LONG RANGE AN/TAS-8 (LRAS3) | 10 |
| LIGHT THERMAL WEAPONS SIGHT: AN/PAS-13(V1) | 4 |
| MEDIUM THERMAL WEAPONS SIGHT: AN/PAS-13(V2) | 16 |
| HEAVY THERMAL WEAPONS SIGHT: AN/PAS-13(V3) | 30 |

Reconnaissance Troop, Reconnaissance Squadron, HBCT

## *Appendix B: Equipment of the ARS*

**M3 Cavalry Fighting Vehicle**

**M1114 Armored HMMWV**

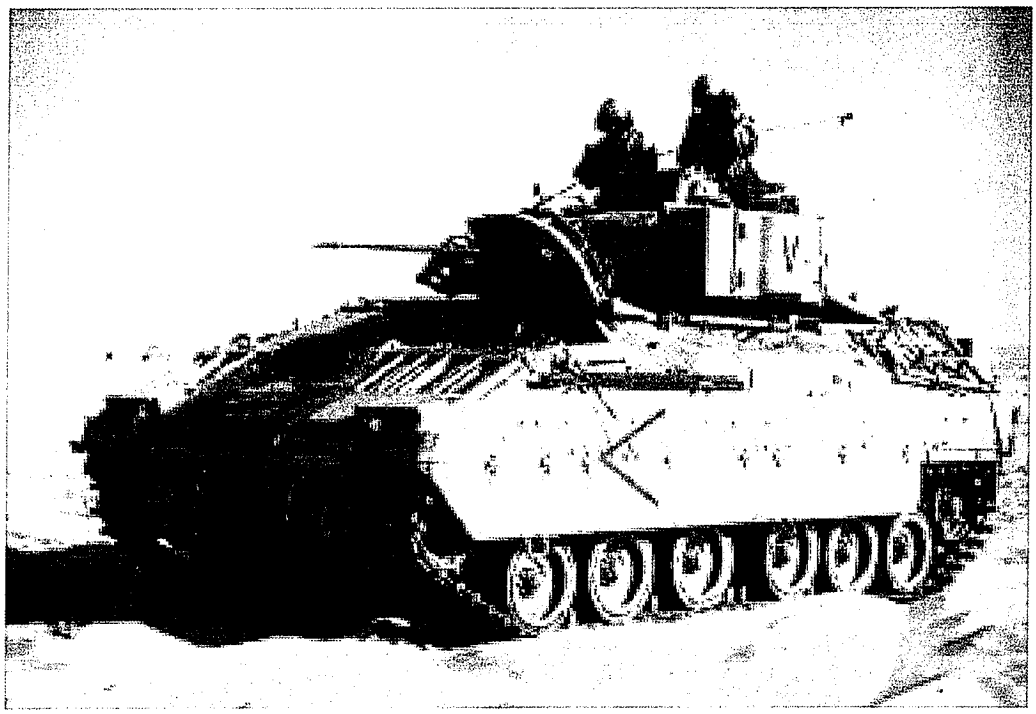
**M1064 120mm Mortar System**

**Long Range Scout Surveillance System (LRAS3)**

**Raven UAV**

# M2/M3 Series Bradley Fighting Vehicle

http://tech.military.com/equipment/view/88731/bradley-fighting-vehicle-m-2-m-3.html



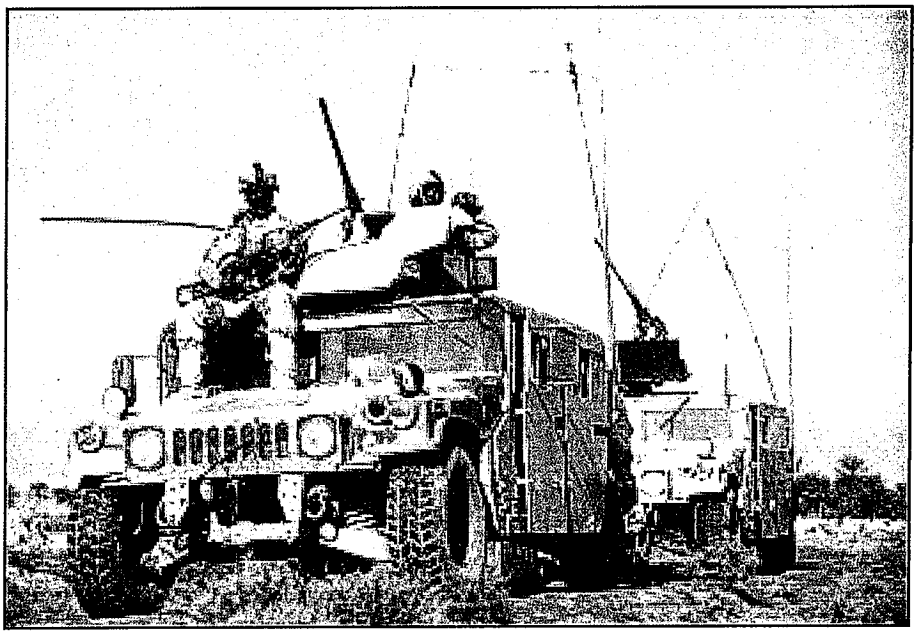
The BFVS is a lightly armored, fully tracked fighting vehicle that provides cross-country mobility, mounted firepower and protection from artillery and small-arms fire. It is used in mechanized infantry and armored cavalry combat.

It possesses sufficient cross-country mobility to keep up with the Abrams Main Battle Tank, medium and long-range firepower capable of defeating any vehicle on the battlefield, and is adequately armored to protect the crew from artillery and small arms threats. The Bradley is able to close with and destroy enemy forces in support of mounted and dismounted Infantry and Cavalry combat operations. The Bradley Fighting Vehicle family currently consists of two vehicles: the M2 Infantry Fighting Vehicle and the M3 Cavalry Fighting Vehicle. Just as with its predecessor, the M113 family, the Bradley will eventually be the platform for a wide range of support vehicles.

Infantry can fight from inside the vehicle by using modified M-16 rifles mounted in firing ports or may dismount from the M-2 version to fight on foot. The vehicle is armed with a 25mm cannon, effective against most armored targets, and with the TOW missile, effective against lightly armored targets out to its maximum range of 3,750 meters (2.3 miles).

# M1114 Armored High Mobility Multi-Purpose Wheeled Vehicle (HMMWV)

http://tech.military.com/equipment/view/141997/m1114-enhanced-capability-hmmwv.html



The M1114 High Mobility Multi-purpose Wheeled Vehicle (HMMWV) is a 4-door, diesel powered, 1.25-ton capacity utility vehicle capable of operating in either 2-wheel or 4-wheel drive. The M1114 is 16.2 feet long, 7.5 feet wide, and is 6 feet tall. It is equipped with an automatic transmission and in most configurations provides seating for four passengers (the vehicle can be operated with five passengers with one occupying the gunner's station in the vehicle turret, though this position lacks such safety equipment such as seatbelts, and is generally left unoccupied in non-tactical situations.)

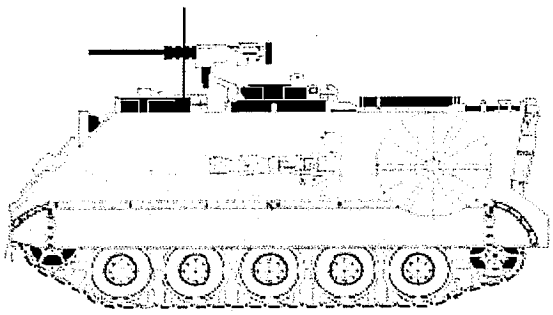
The M1114 is equipped with a single, roof mounted weapon station. This station can accommodate a single machine gun (either M2 .50 caliber, M249 5.56mm, or M240 series 7.62mm) or the Mk. 19 40mm automatic grenade launcher.

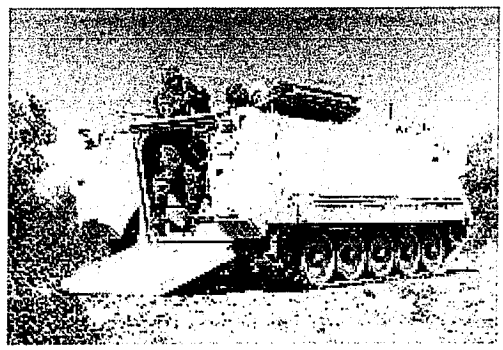
The armor package provided by the M1114 provides all round coverage against 7.62mm AP ammunition, 155mm artillery blast protection from above or below the vehicle. The M1114 can survive the detonation of a 12-pound TNT charge under the front portion of the vehicle, and a 4-pound charge in the rear.

The M1114 has a curb (empty) weight of 9,800 pounds, a maximum weight of 12,100 pounds, and a load weight of 2,300 pounds. The maximum towing capacity of the M1114 is 4,200 pounds. The M1114 has a top speed of approximately 75 mph, and a cruising range of approximately 275 miles. The M1114 can climb a 40% grade and traverse a 30% side slope.

# M1064 Self-propelled 120mm Mortar

http://www.fas.org/man/dod-101/sys/land/m1064.htm





The M1064A3 has the same silhouette as the M113A3 Personnel Carrier and features a welded-in cross beam, additional floor support structures to withstand mortar reaction forces, and an enlarged three-piece top firing hatch. The 120mm weapon has a 90 traverse for firing over the rear of the vehicle.

The M106 107mm Mortar Carrier has a 4.2 inch (107mm) M30 mortar mounted on turntable in the rear which fires through a large hatch in the roof. The baseplate for the mortar is mounted externally on the left side of the vehicle for use when firing the mortar dismounted. The M125 is of similar design, carrying a 81mm mortar. Kits to convert M106 and M125 vehicles to the M1064A3 configuration are available.

| General | |
|---|---|
| Weight, combat loaded | 28,240 lb. (12,809 kg) |
| Personnel capacity | 6 |
| **Performance** | |
| Speed on land | 40 mi/h (64 km/h) |
| Speed in water, with track | 3.6 mi/h (5.8 km/h) |
| Cruising range | 300 mi (483 km) |
| Turning radius | Pivot to infinite |
| **Armament** | |
| 50 cal MG | 2,000 ready rds. |
| 120mm Mortar | 69 ready rds. |
| **Squad Weapons** | |
| Machine gun,M60, 7.62mm | 2 |
| Rifles, M16A2, 5.56mm | 3 |

# Long Range Scout Surveillance System (LRAS3)

http://www.knox.army.mil/center/ocoa/armormag/backissues/1990s/1998/nd98/6jones98.pdf

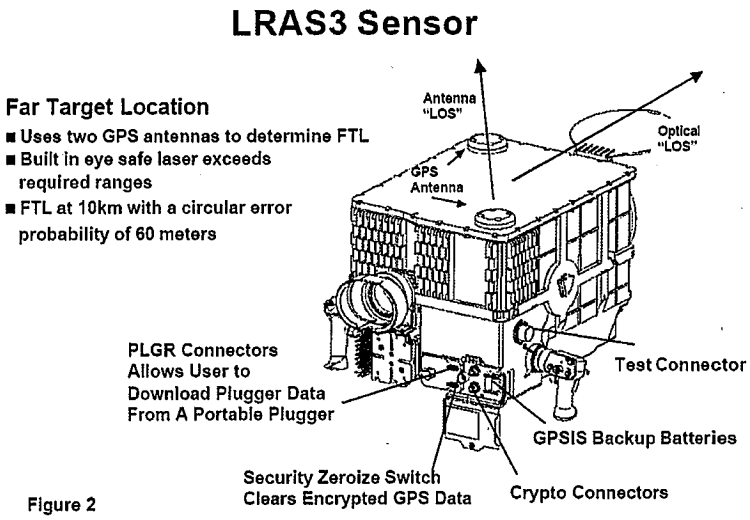



Figure 2

The heart of the LRAS3 system is the advanced thermal imager Second Generation Forward Looking Infrared, (FLIR). This is the same Horizontal Technology Integration (HTI) FLIR to be fielded on the M2/M3A3 and M1A2. The LRAS3 will have a 15% increase in range capability over other 2nd Generation FLIR platforms utilizing the standard size afocal.

The LRAS3 has a built-in Global Positioning System Interferometer Subsystem (GPSIS). This allows the LRAS3 to determine target bearing and self-location. An eye-safe laser rangefinder, coupled with the GPS, will provide Far Target Location (FTL) and display a ten-digit grid coordinate of a target within 4/10 of a second after lasing. The scout operator will be able to update every second if needed. The FTL data will be accurate to within 60 meters at 10 kilometers. At lesser ranges the FTL error is considerably smaller. Using the FTL feature will allow scouts to call for more accurate and timely indirect fires.

The LRAS3 will also have a back-up day video camera that allows the scout to compare FLIR to TV images. The LRAS3 hand stations are modified Improved Target Acquisition System (ITAS)2 controls that will allow the operator to perform all LRAS3 functions without taking his eyes off of the display.

LRAS3 will almost triple the detect capability of the HMMWV scouts using the AN/UAS-11. The display options for viewing include a wide field of view (WFOV) with 4-power magnification, for scanning, and a narrow field of view (NFOV) with 12-power, providing more detailed scanning capability. The operator may also select an electric zoom feature that provides a 2X (8-power) capability in WFOV and both 2X (24-power) capability and 4X (48-power) capability in NFOV. These levels of zoom will be used primarily after a target is suspected or detected. If the target is still not recognizable, the operator may use the frame integration function to improve the sensitivity of the sensor. This function takes less than a second and involves the electronic integration of 2, 4, 8, or 16 frames and averages them to improve the image sensitivity, making the shapes of the target sharper and thus increasing range performance of the LRAS3.

LRAS3 will also interface with the Future Battle Command Brigade and Below (FBCB2). The scout will be able to detect an enemy, conduct a FTL, dump the enemy location into a spot report, and then send the report forward via FBCB2. FBCB2 will provide the scout a digital link for reporting, call for fire, and situational awareness.

# RQ-11A Raven Unmanned Aerial Vehicle (UAV)

http://www.ngb.army.mil/features/nevada/news/RQ-11_fact_sheet.pdf

**General Characteristics**
**Length:** 3 ft 7 in
**Wingspan:** 4 ft 3 in
**Weight:** 4.2 lb
**Speed:** 60 mph
**Ceiling:** 15,000 ft
**Range:** 6.2 miles
**Flight Duration:** 80 min
**Propulsion:** Aveox 27/26/7-AV electric motor

The aircraft's wartime applications include intelligence, surveillance and reconnaissance. The Raven system is a hand-launched aircraft that carries an infrared camera and a day-time color camera. Video is sent from the aircraft to a laptop computer on the ground and can immediately be sent nearly anywhere in the world. The entire system can be carried by two soldiers with backpacks. The cost of a single Raven system, which includes three aircraft and the laptop, is about $270,000.